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ABSTRACT

Five science reading booklets were developed to foster the development of communication, observation, and experimentation skills in Uganda elementary school students. Topics selected, resulting from interviews with teachers and students, included: 1) rain; 2) round worms; 3) caterpillars; 4) butterflies; and 5) insects in the school ground. Booklets were evaluated after an initial trial (focusing on vocabulary level, time required to read the readers, student interest, whether related activities were workable and simple, and suggested improvements). Following revisions based on the trial editions, revised readers were evaluated by observing students and teachers using the readers and analyzing questionnaires designed to assess cognitive, psychomotor, and affective impacts of the readers on students and teachers. Results indicate that the readers aroused and maintained student interest, developed scientific skills and attitudes, and enabled students to gain science knowledge through independent or group reading. In addition, it was demonstrated that well-written, inexpensive, supplementary reading materials could be produced to encourage appreciation of written materials among students of low-income parents in rural areas. The five readers and questionnaires used are included. (Author/JN)

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African Studies in Curriculum Development & Evaluation

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DEVELOPING AND EVALUATING SUPPLEMENTARY SCIENCE READERS FOR PRIMARY 3 PUPILS IN UGANDA

ACD Project

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This research project was undertaken as part of a training programme jointly organised on behalf of the African Curriculum Organisation (ACO) by the Kenya Institute of Education (KIE), the University of Nairobi, and the German Agency for Technical Cooperation (GTZ).

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CHAPTER 1.

PURPOSE OF THE STUDY AND REVIEW OF LITERATURE.

Teaching Science today emphasises the teachinng of Scientific skills such as Observation, Communication, Experimentation, Formulation of hypothesis, Classification, Measurement and Interpreting data. Scientists use these skills to find out information and knowledge from different sources. These skills help the Scientist also to solve problems. Some times these skills are called Scientific processes.

Books are one of the best sources of science knowledge. Being able to read science books, in search of science knowledge, makes one self-reliant in thinking and better able to widen ones science horizon and therefore better able to solve problems scientifically.

In his article 'The reader passport', Richard Bamberger supports methods of teaching which promote independent work when he writes;

> "The goal of the modern teaching programme is to move away from the old fashioned methods of instruction, in which the teacher at the head of the classroom, pumps his pupils full of information and towards methods which promote independent work according to the abilities of the child. Today the development of interests is emphasised instead of information and knowledge itself and teaching children to work independently with books is one means of achieving this aim."[1]

Books are very important because learning is a life long process. When children leave school, they should be

1. Bamberger Richard. The reader passport. Prospects 1972, 2, 214.

able to continue to learn on their own. One of the means of independent learning is through books. This view is also supported by A. Markkushevich in his article 'Living with books', when he says that the book remains a steadfast and devoted friend to man in all his doing, his joys and his sorrows, from the cradle to the end of his days. The ability to read lies at the very root of systematic learning. Among the many technical inventions to the credit of mankind, books still continue to be the best source of knowledge, companions and counsellors. They can be cheap and more readly accessible to all than televisions, radios or overhead projectors. They can be distributed every where and kept for long periods of time.

Although books are very important sources of knowledge, there are very few appropriate books for children to read in Uganda. This is because very little attention has been given to the development and writing of children's books by indigenous scholars of Uganda. It has been observed in developing countries that the book is often a foreign importation and a specific import allocation has to be made for books in the annual budget. This has posed a serious dilemma in Uganda.

> "Yet the book," writes Kalu K. Oyeok, "is the tool in Education. It was time to give to it priority."[2]

This study intends to produce children's Science reading materials in booklet form to minimize the problem of lack of

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2. Kalu K.Oyeok. Integrating the book into African Development. Prospects 1972, 2, 215.

pupil's books. It also intends through these reading materials to develop the important Scientific skills of communication, observation and experimentation.

IMPORTANCE OF THE STUDY.

Uganda is one of the less developed countries. Her foreign exchange resources are limited. She can not import adequate books for the 3 500 Primary Schools and 125 Secondary Schools. This means that many children can not obtain books to read. In this project it is assumed that if an effort is made to develop and write children's books in the country, the books will be cheaper and more available, hence give an opportunity to as many children as possible to get books to read and find out knowledge by themselves.

Making books available to children is very important. In 1970, the General Conference of UNESCO adopted a resolution proclaiming 1972 an International Book Year. The conference invited member states to encourage authorship and the production and distribution of books, to elaborate book policies taking into account the particular role of the printed word for the transmission of knowledge and stimulation of ideas. To encourage an appreciation, particularly among young people, scientific thinking, philosophy and literature by making books generally and cheaply available.

It is important to note that the majority of pupils in Uganda come from the under privileged social stratum in which the only cultural tradition is an oral folk tradition. The written word of whatever kind has no place in this social stratum. It is also, a fact that the children of higher

income families acquire a taste of reading because they have picture books which their parents buy for them. It has been alleged that the children from under privileged environment do not like reading.

> "If they do not read, if they do not like reading, it is because their background has not provided and still does not provide any encouragement to read."[3]

The books developed in this study are intended to provide pupils with science reading opportunities and encourage them to like reading.

This is expressed by Albert Beguid 1960 when he writes,

> "We are certainly the sum of our encounters with other people, of all sorts of hazards, of our sorrows and our triumphs but we are also to a vast, immeasurable degree, the product of the books we have read, those books which become part of our very substance."[4]

As mentioned earlier, some of the most important scientific skills a scientist uses are Communication, Observation, Experimentation and Interpreting data. These materials are specifically intended to develop these four scientific skills. A Scientist has to be able to share his ideas with other Scientists. Communication is a two way skill. This is expressed by Young when he writes,

> "The Scientist has to read and interpret what other Scientists have written."[5]

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3. Chadly Filouri. An Experiment in reading motivation techniques Prospects Vol. II No. 2, 1972 Page 206.

4. Albert Beguin Esprit April, Title 1960. Prospects Vol. II No. 2 Summer 1972 Page 206 pp I

5. Young B.L. Teaching Primary Science. London: Longmans Group 1979 p.11

Many times, he has to be able to understand their graphs and tables. Pupils have to learn this skill of communication. They have to learn to distinguish relevant information from irrelevant information. They have to learn how to present information in the form of charts. Most activities in science involve this communication process. Communication, Observation and experimentation are fundamental scientific skills.

RELEVANCE OF THE STUDY TO CURRICULUM DEVELOPMENT.

In developing a Curriculum, three stages are very important to remember namely: The formation of objectives, the provision of learning experiences and opportunities and evaluation of learning that has taken place. Many times the implementation of Curriculum at various levels of education i.e. Primary and Secondary has failed due to lack of instructional materials for both the teacher and the learner. Among the important learning experiences are books for the pupils. It has been found that text books are an important factor in improving the performance of the learner (Brigginshaw, 1980). For a Curriculum to succeed therefore there should be a provision of instructional materials most important of which are pupil's books.

In choosing or developing pupil's instrucational materials, the Curriculum developer is guided by three main points, namely: Whether or not the materials are relevant to the learner's needs, relevant to the society and relevant to the subject matter of interest.

In 1977 the National Curriculum Development Centre, Ministry of Education revised the Primary Science Curriculum and made it more environmental, activity based and relevant to the learner and his community. The revised science syllabus requires the pupils to do science through an inquiry or discovery approach.

The total Primary School enrolment is over one million pupils. One of the complaints teachers have is shortage of text books, pupils' books and pupils' workbooks to facilitate effective teaching and learning. This shortage of books is

emphasised in the following quotation:

> "As for text-books, in particular, the shortage is alarming. We recommend that the Ministry of Education encourages and sponsors and even pays (possibly through the Curriculum Development Centre) identified personnel to write text-books covering the entire curriculum for school use. This is a first priority case, if we are to make our programme content relevant to our National aims of both present and future development." 6

The Ministry of Education can not import all the books required for its primary schools due to lack of funds and foreign currency in particular.

The Ministry, therefore through the National Curriculum Development Centre is encouraging knowledgeable indigenous Ugandans to write books for the schools. Uganda's Primary Education consists of a seven-year course which provides general instruction in subjects such as English, Mathematics, Social Studies and General Science. About 80% of pupils who complete Primary seven do not continue with formal Secondary School education. After Primary school, about 20% of the Primary 7 pupils proceed to a 4 year Secondary education course.

The Science reading materials are important to primary 3 pupils because it is alleged that the reading level acquired after four years of Primary School is about the minimum, to assure sufficient experience and retention of what has been learnt. This being the case, these materials are relevant to these pupils of Primary three because the materials will encourage them to read more and sustain their interest in the written materials. The pupils will also be able to retain what they will have read.

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6 Hartwell A.S.: Educational Innovation for National Development. Makerere University Press, Kampala, 1976

As many children drop out of school at about primary three and four, learning how to read or finding out knowledge by themselves gives them a chance to continue to learn from books when they leave school. These materials are relevant to the pupils also because they are written on what they want to know. What has been written in these materials are ideas and problems they have themselves raised.

CHAPTER 2

PROCEDURE.

Ten principal procedures were employed.

1. Interviews

Unstructured interviews and discussions were held with:

(i) Teachers of Primary 3 at Namutamba Demonstration School, Uganda.

(ii) Primary 3 pupils

(iii) Mrs. Kiyimba, Primary three English and Science teacher.

These interviews served to find out some science topics which pupils were most interested in and are found in the Primary Science Syllabus of Uganda. They also gave insight about the level of English vocabulary familiar to primary three pupils. They also prepared the teachers to work with these Science Readers.

2. Selection of the topics for the supplementary readers.

Arising fror the findings from interviews, the following topics were selected for the supplementary science readers.

Reader Number 1. "Where does rain come from"?

Reader Number 2. "Kamya finds out where roundworms come from."

Reader Number 3. "Where do butterflies come from?"

Reader Number 4. "Insects in our school compound."

Reader Number 5. "Where do caterpillars come from?"

These topics were selected because:

(a) Primary 3 pupils showed interest in them.

(b) They were in the Primary Science Syllabus. Therefore pupils and teachers would not feel that they were wasting time when reading them and working with them.

(c) They would contribute to the development of the following scientific skills:

Observation.

Experimentation.

Inquiry.

Communication.

Recording and Reporting.

Interpretation of data.

(d) The concepts were simple enough to be understood by pupils of primary 3.

(e) The topics were relevant to the pupils and their environment for example,

Rain

Is very common and controls a lot in the general life of the pupils and the community e.g. planting, playing, weeding, getting water and harvesting.

Round worms

This is a common infection of pupils in this environment. Knowing to prevent them is very important to the health of the pupils.

Caterpillars.

These are dangerous pests to many cash and food crops such as: Potatoes, Cabbages and Oranges. Knowing their life cycle is important in controlling them.

Butterflies.

Butterflies are very common in the school compound. Their life cycle introduces pupils to a very important science phenomenon. The study of the life cycle of butterflies gives pupils chance to experiment, observe, record, report and communicate.

Insects in the school compound.

This is an introduction of the study of ecology at a very elementary level. It makes pupils become familiar with their environment. It also teaches pupils how to interprete their findings.

3. Writing the readers.

The readers were written using names of people in the school environment. Readers dipicted what is usually done in the school environment such as visiting the hospital with father, collecting potatoes with mother, bringing an unusual insect to the teacher to tell them the information about it. Introducing children to the inquiry approach by the teacher by asking pupils to go and find out. The readers were kept original so as to generate pupils interest in written science material.

4. Trial of the readers.

The first drafts of the readers were tried with Primary 3 pupils by the author together with the regular class teachers. The first trial was intended to find out:

(a) Whether the vocabulary was at the pupils level.

(b) Whether the activities were simple and workable.

(c) How much time was required to read the readers.

(d) How much interest children had in the readers.

(e) What needed to improve in the readers.

5. Rewriting of the readers.

Following the findings of the first trial the readers were rewritten to remove the hard words and activities.

6. Second trial of the readers.

The final written readers were again tried in the same class. The teacher was asked to fill in the teachers questionnaire and pupils were also asked to answer the pupils questionnaire about the readers.

7. Final writing of the readers.

The readers were finally written after the second trial in the class. The drawings were also improved.

8. Direct Observation.

This took two forms:

1. Visits to Primary 3 class to see the interest pupils had in the readers. The interaction between the pupils and the teacher and among the pupils themselves. Their involvement in the activities at the end of each reader. The problems involved and the success achieved.
2. Direct observation and teaching by the author himself to find out the level and extent of understanding of the concepts and principles interwooven in the readers. To find out also the extent to which the intended scientific skills were being developed by the readers.

Owing to various circumstances, only one school was used instead of two schools. Lack of transport made it impossible to use more than one school. The attendance of pupils was not constant every day the readers were tried. The full class was 65 pupils but there were some days when they were fewer.

9. Questionnaire.

Two questionnaire were designed to assess cognitive, psychomotor and affective impacts of the Readers on the pupils and teachers.
The first questionnaire (chapter 4) saught:

(a) Pupils' interest in the readers.
(b) The average time taken to read each reader.
(c) The most interesting activities to the pupils.
(d) The most and least interesting reader of the five.
(e) The reason why some readers were enjoyed more than others.
(f) Pupils' attitude towards learning from a written book rather than teacher/pupil direct teaching.

The second questionnaire chapter 4 saught:

(a) Pupil's preference of the readers and why such preference.
(b) Whether they wanted to read more readers.
(c) What they wanted to read about.

10. Analysing the questionnaires.

The results of the teachers questionnaire was analysed and compared with those of the pupils. The analysis was aimed at assessing the impact of the readers on impvoving pupils science knowledge, developing scientific skills and maintaining pupils' interest in written science materials.

CHAPTER 3.

DEVELOPED READERS AND PUPILS' WORK.

There are five separate readers developed for the pupils. They are:

Readers No. 1. "WHERE DOES RAIN COME FROM?"

Reader No. 2. "KANYA FINDS OUT WHERE ROUND WORMS COME FROM."

Reader No. 3 "WHERE DO BUTTERFLIES COME FROM?"

Reader No. 4. "INSECTS IN OUR COMPOUND."

Reader No. 5. "WHERE DO CATAPILLARS COME FROM?"

PUPILS' WORK.

At the end of each reader, there were some activities to be done by the pupils. The objectives of these activities were that at the end of each reader pupils should be able:

(a) To carry out experiments from the readers.
(b) To observe, record, draw and report on the experiments and make their own conclusions.
(c) To answer some comprehension questions about the reader and to find out their understanding of what they have read.
(d) To analyse and interprete the data collected by themselves.

SUPPLEMENTARY READER NO. 1 FOR PRIMARY 3

WHERE DOES RAIN COME FROM?

It was Friday morning. Primary three was in the classroom. It rained very much. Girls and boys came out for break time. They saw much water in the compound.

Mukandoori asked: "Where does rain come from?"

Lwere answered : "I don't know."

They all asked : " But where does rain come from?"

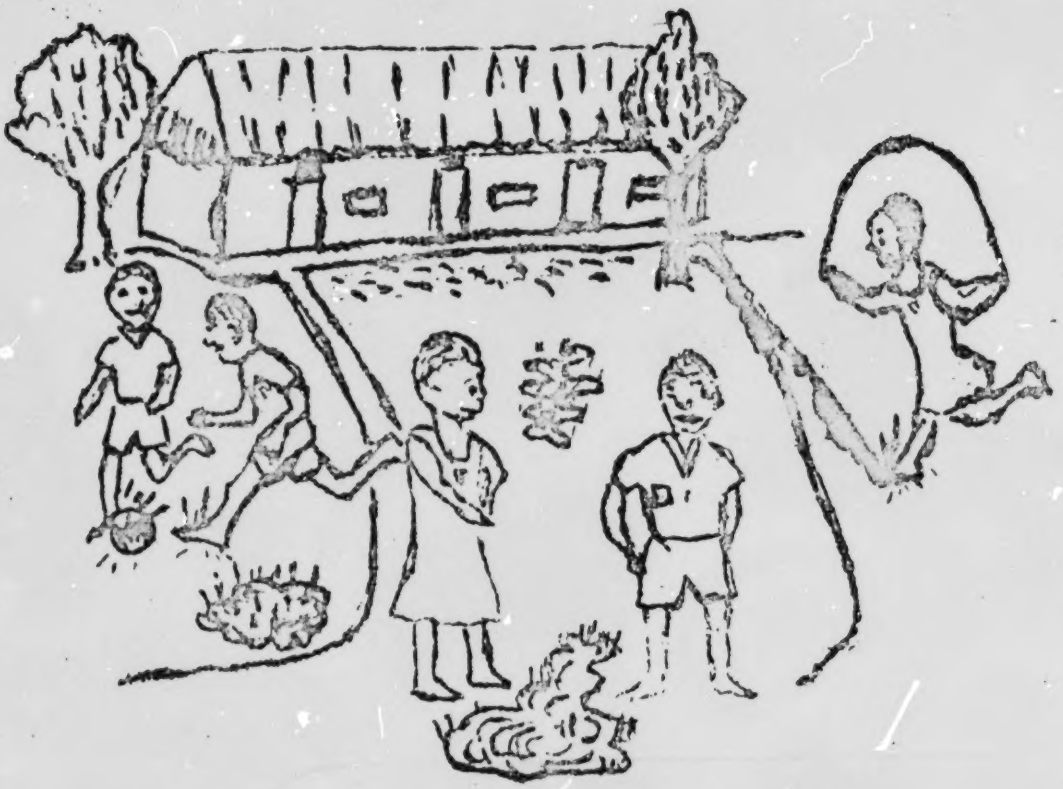


Fig. 1 22

They were playing. The sunshine came. Lwere said to his friend:

"Look, what is that? It is like smoke going up."

Is it smoke ? Let's ask Birungi from Primary seven.

Birungi said : "That's not smoke. It's water vapour going up. It is called WATER VAPOUR. It comes from warm water."

Mukandoori Asked: " What made it warm?"

Birungi: "Sunshine made it warm. Water vapour goes up like boiled water from a kettle."

Lwere : "Oh yes, I always see some water vapour going up from kettle and cooked food."

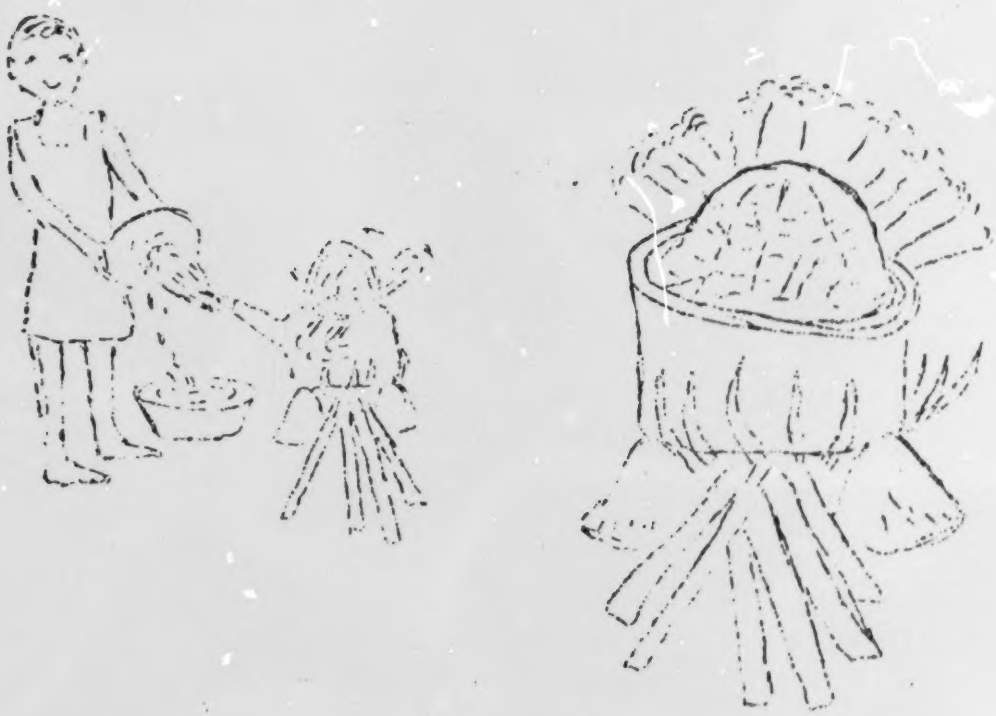


Fig. 2

Birungi : "When water vapour goes very high it gets very cold. It forms clouds and falls down as rain. Again water vapour goes up. It gets cold and falls down as rain again. Look at the clouds. It is where rain comes from."

They said : "Thank you Birungi."

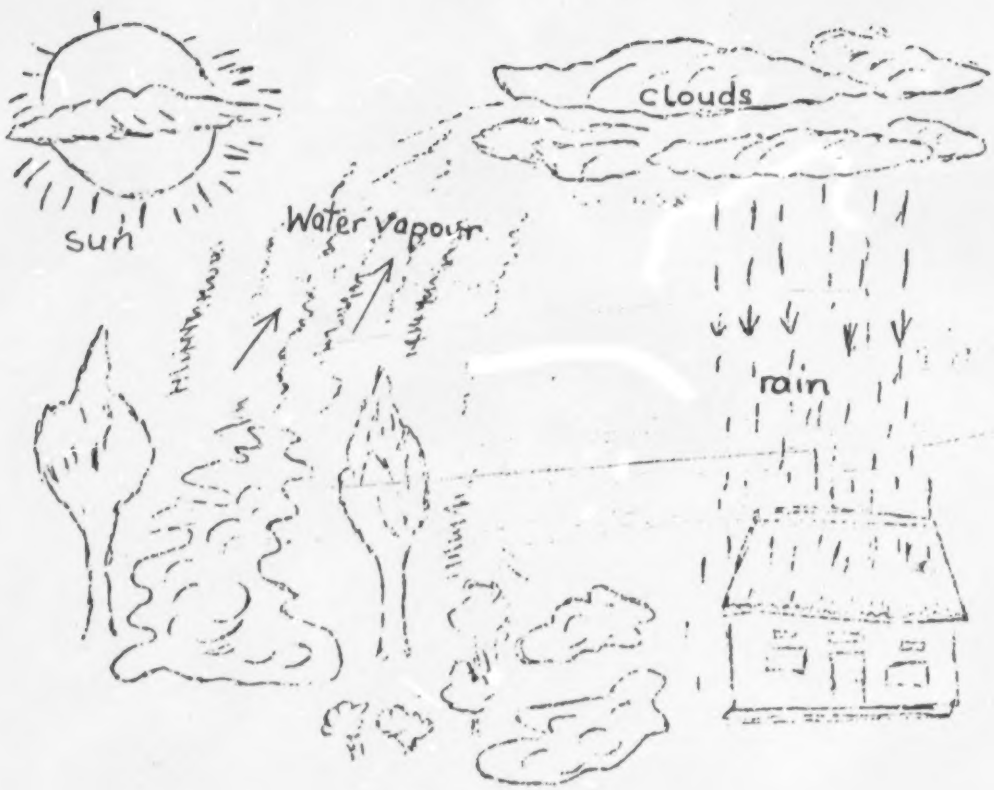


Fig. 3

ACTIVITIES.

1. Make some rain from boiling water in a kettle.

2. Put some little water in a sourcer or plate. Put it in the sun for 6 hours. What happened to water ?

3. Go out after rain. What do you see when the sun shines ?

4. Fill in the correct words.

(a) The sun warms.....on the ground. (water, tree)

(b) Water changes into.....(water vapour, dirty water)

(c) This water vapour.....up. (goes, changes)

(d) When water vapour gets cold, it forms.....(clouds, smoke)

(e) Rain falls from.....(clouds, air).

We put some little water in a basin and put it in the sun.

After six hours water had gone up and dried.

Pupils observing and discussing experiment on water evaporation.

Fig. 4

SUPPLEMENTARY READER NO. 2 FOR PRIMARY 3.

KAMYA FINDS OUT WHERE ROUND WORMS COME FROM.

Kamya : " There was much wind at night."

Nakamya : " Yes, it was blowing very hard."

Kamya : " I think many mangoes fell down."

Nakamya : " Let's go and see.
Run - Run - Run, David will take them all.
Let's go before David."

Bwogi : "Don't leave me. I'm coming."

Kamya : " Don't come. We shall bring two mangoes for you. You are very young. You can't run."

Fig. 5

Kamya : " Ho! Look at this. It is very sweet."

Nakamya : " But don't eat dirty mangoes, teacher told us to wash them first."

Kamya : " I shall eat only one. It's not bad. This is for Bwogi."

Nakamya : " Dirty mangoes give stomach pain, you know !"

Fig. 6

After two weeks.

Kamya : " Father, I have stomach pain."

Father : " What did you eat ?"

Kamya : " Nothing bad."

Nakamya : " Kamya is telling you lies. He ate dirty mangoes. He gave one to Bwogi. The teacher told us not to eat dirty mangoes."

Father : " Did you eat dirty mangoes ?"

Kamya : " I ate only one and Bwogi only one ?"

Father : " Let's go to the hospital.
Bwogi, why are you crying?"

Bwogi : " Stomach pain."

Father : " Come let's go to the hospital.
Bwogi and Kamya told the Doctor that they had stomach pain.

Doctor : " Bwogi, take this medicine. Kamya, take this. Come back tommorrow."

Bwogi and Kamya: " Thank you Doctor."

Fig. 7

The following day, Kamya put his brother Bwogi on "Poti." Kamya saw some big, white round worms. He showed them to father. The next day, Kamya, Bwogi and father went back to hospital. Father showed the Doctor the round worms.

The Doctor said. : " Those are round worms. They come from dirty mangoes. You ate dirty mangoes. There were round worm eggs on the mangoes. The eggs changed into round worms. The worms gave you stomach pain. You must wash mangoes and other fruits and vegetables before you eat them. If you wash fruits you will not get round worms."

Kamya : "Thank you Doctor."

Fig. 8

ACTIVITY NO. 1.

Fill in the correct word.

1. Kamya ate.....mangoes. (dirty, young)
2. Kamya gave Bwogi.....mango. (one, two)
3. Kamya and Bwogi got stomach.....(pain, trouble)
4. Doctor said. Dirty mangoes bring.....(round worms, insects)
5. Round worms bring.....pain. (stomach, eye).
6. We must.....fruits before we eat them. (wash, cut.)

ACTIVITY NO. 2.

Tell how Bwogi got round worms in his stomach.

WHERE DO BUTTERFLIES COME FROM ?

It was Monday. Kawala was in her potato garden. Mukasa was with his mother Kawala. Kawala was removing bad potato leaves. Mukasa saw many butterflies. They were flying up and down. Mukasa asked, "Mother, where do butterflies come from ?"

Fig. 9

Mother : " I don't know. I didn't go to school. You will ask your father."

Mukasa : " See these caterpillars, they are not moving. Are they dead?"

Mother : " Take them to your father and ask him. He knows many things."

Mukasa : I shall take them to father and ask him. Father, look at these"caterpillar". What are they doing?"

Father : "They are sleeping. Keep them in a tin. Cover the tin. Look at them every day and tell me what you see."

Fig. 10

Mukasa did what his father told him. After twentyfour days, he saw young butterflies in the box.

Mukasa called his father, mother and sister to see.
They saw butterflies.
They said : "Butterflies come from sleeping caterpillars."

Fig. 11

ACTIVITY NO. 1

Keep caterpillars in the classroom like Mukasa. Look at them for 28 days. Feed them with potato leaves. What do you see ?

ACTIVITY NO. 2

Tell the class where butterflies come from.

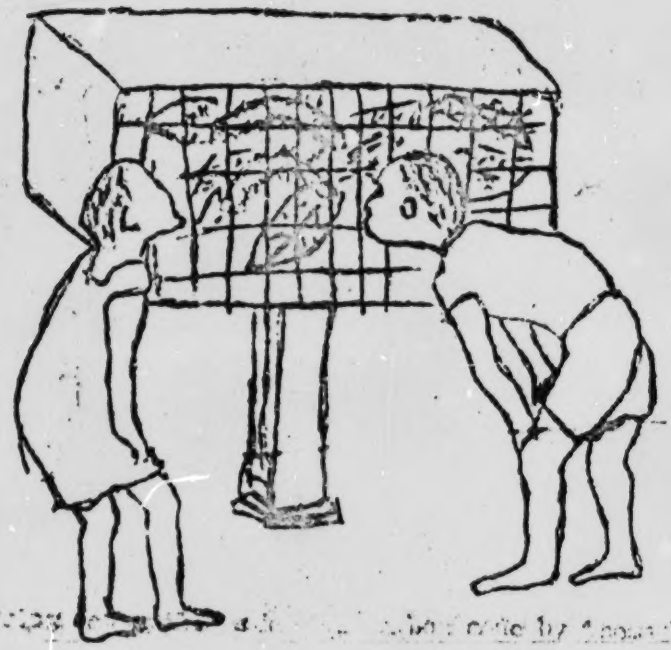


Fig. 12

Pupils observing caterpillars kept in a box made by themselves. The class tried what Mukasa did. They made a wooden box in which they kept some caterpillars. They fed caterpillars on potato leaves. They observed the caterpillars several times a day.

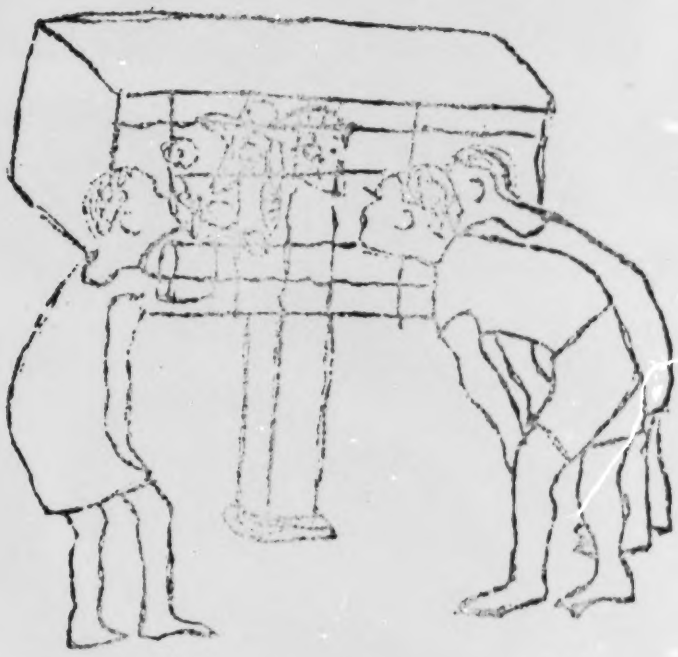


Fig. 13

The class observing butterflies in the box.

After twentyfour days, the class saw young butterflies in the box. They called their teacher to see.
They concluded : " Butterflies come from sleeping caterpillars."
Other pupils in the school were also very interested in the experiment.

SUPPLEMENTARY READER NO. 4 FOR PRIMARY 3

INSECTS IN OUR SCHOOL COMPOUND.

It was break time. It was shining. Kamulali and Nsabayezu saw an insect. It was on grass. It was quiet. He called others. They saw it. They asked : " Is it going to jump ? Is it an insect? Is it praying ? What is it's name ? Let's take it to the teacher. Who will catch it ?"

Teacher said : Where did you find it ?

Kamulali : In our compound Sir. Tell us it's name.

Teacher : Read this book from your class library. It is on insects. Find out its name and what it does. Tell me what you find out.

The class read the book.

Class : It's called a praying mantis. It stands like some one praying. Like this. It catches other insects. It uses its front legs.

Teacher : Let's find out about other insects. How shall we find out ?

Nsabayezu : Every one will walk and catch the insects he sees.

Teacher : Good, but be careful. Do not kill them. Walk around the school compound only. You will work in groups.

Class : We need bags, tins, papers, nets or cloth to collect and keep them.

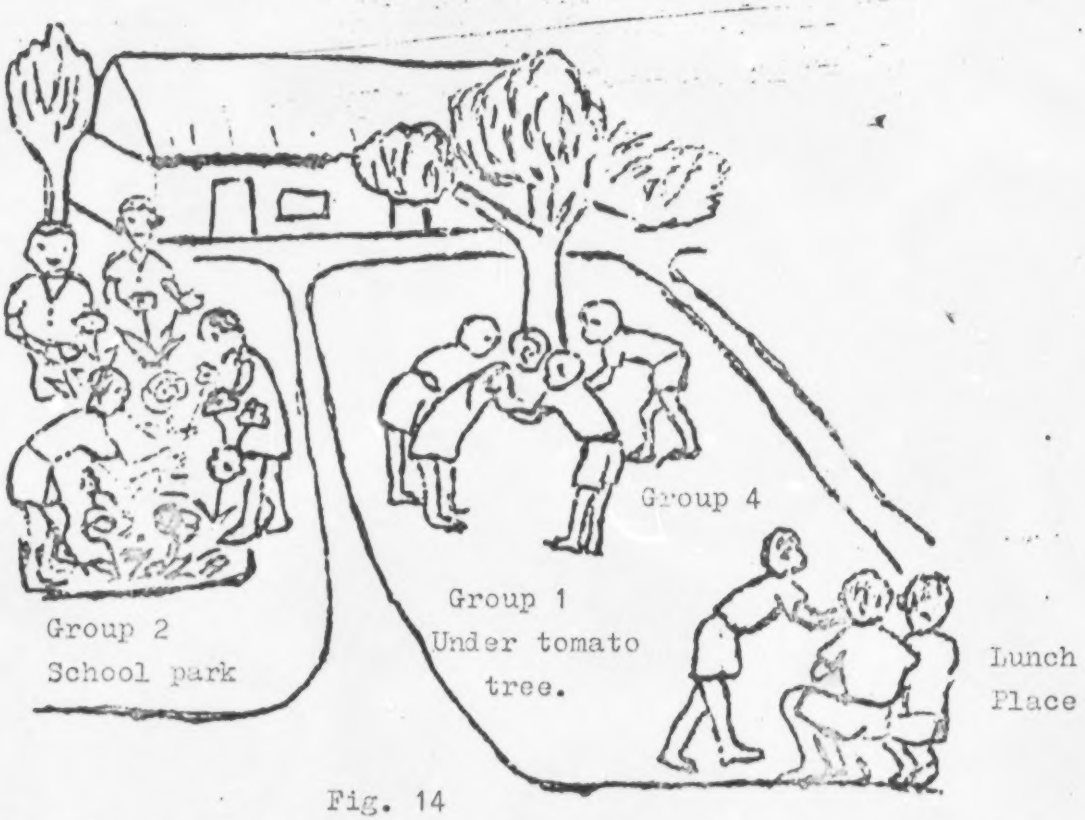


Fig. 14

Pupils collecting insects from different places in the compound. They did this in groups.

Pupils discussing with the teacher the praying mantis they had found.

Fig. 15

ACTIVITY NO. 1

Collect insects from the school compound.

Complete this chart.

Place where found	No.	Name of insect	Drawing of insect

ACTIVITY NO. 2

1. How many different insects were collected ?
2. Which insect was found in biggest number?
3. Who collected the biggest number of different types ?
4. Who collected the biggest number of insects ?
5. Return insects alive where you found them.

PUPILS' WORK

When pupils had carried out the above activities 1 and 2, they drew their findings and analysed and interpreted what they had found.

INSECTS FOUND IN THE COMPOUND

PLACE WHERE FOUND	NO. FOUND	NAME OF INSECTS
GROUP 1 UNDER TOMATO TREE	6	Nsolosozi, Nyenje, Namunyenye, Kikenembi, Munyeera, Ekinyomo.
GROUP 2 UNDER MANGO TREE	10	Kiwojjolo, Kikenembi, Janzi, Kinyomo, Kisanyi Munyeera, Nsweera, Nsolosozi, Nabbubi, Kalalankoma.
GROUP 3 IN THE SCHOOL PARK	8	Janzi, Munyeera, Nabbubi, Nsolosozi, Kadoma, Nsenene, Kiwojjolo, Kanyenye-nkule.
GROUP 4 WHERE WE TAKE LUNCH	5	Kanyenyenkule, Enyenje, Munyeera, Kikenembi, Nsolosozi.

ACTIVITY NO. 2

How many different insects were collected?	15
Which insect was found in biggest number ?	Nsolosozi
Who collected the biggest number of insects ?	Group 3
Who collected the biggest number of different types?	Group 3
Some insects died before returned.	

Insects pupils drew from their collection.

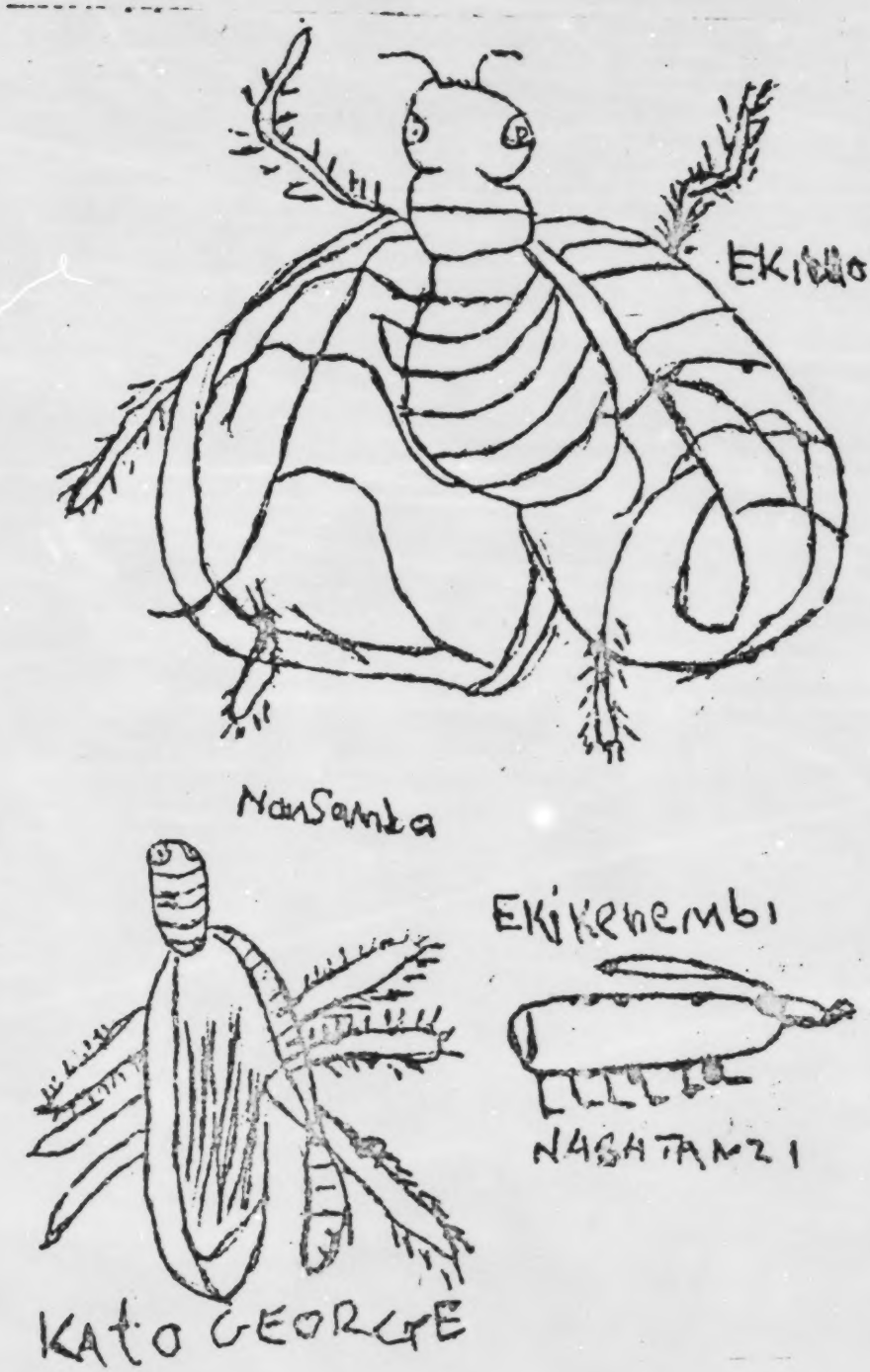
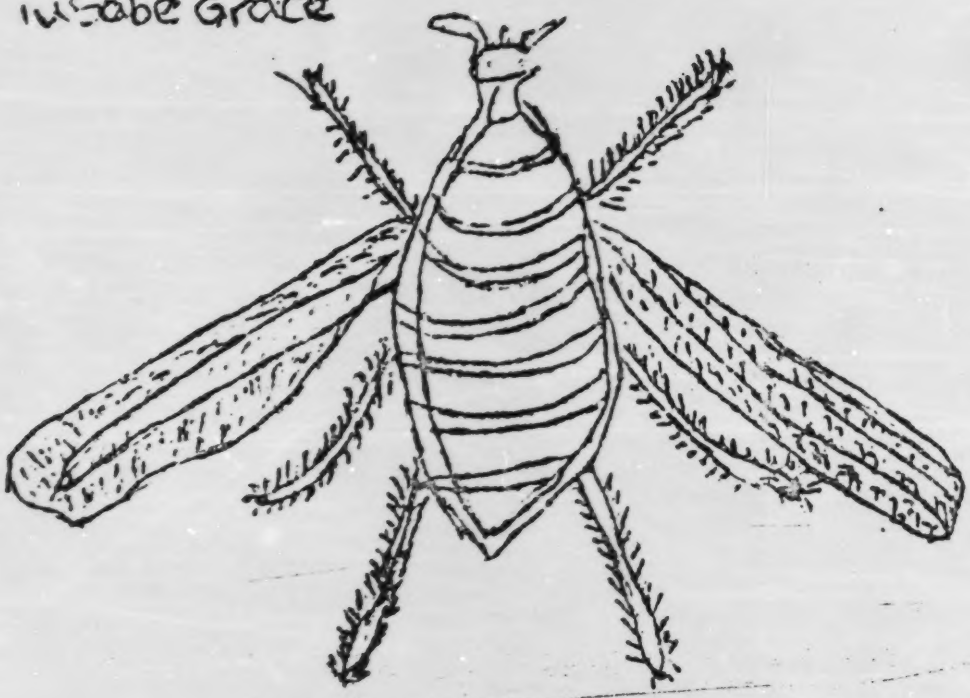
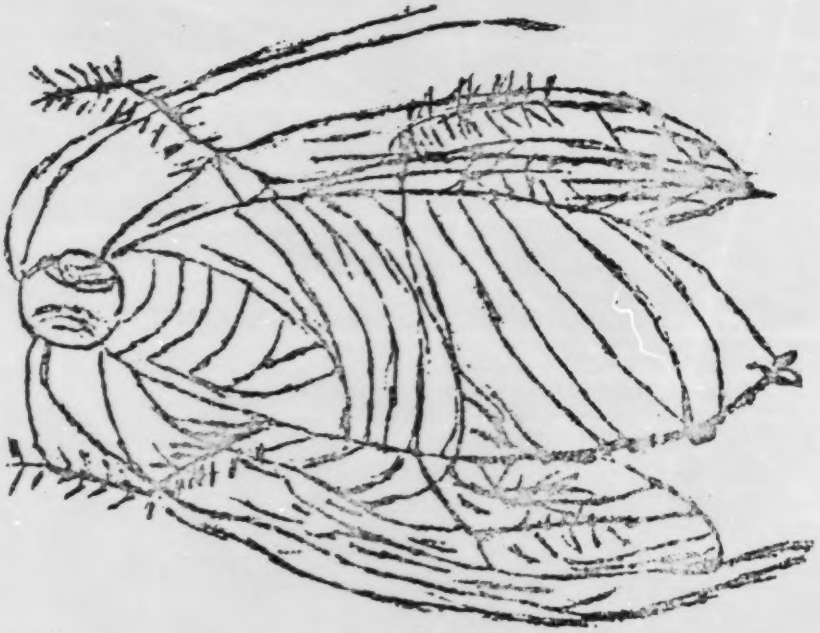


Fig. 16

Tusabe Grace



Djanzi



Tusaba

COCKROACH

Fig. 17

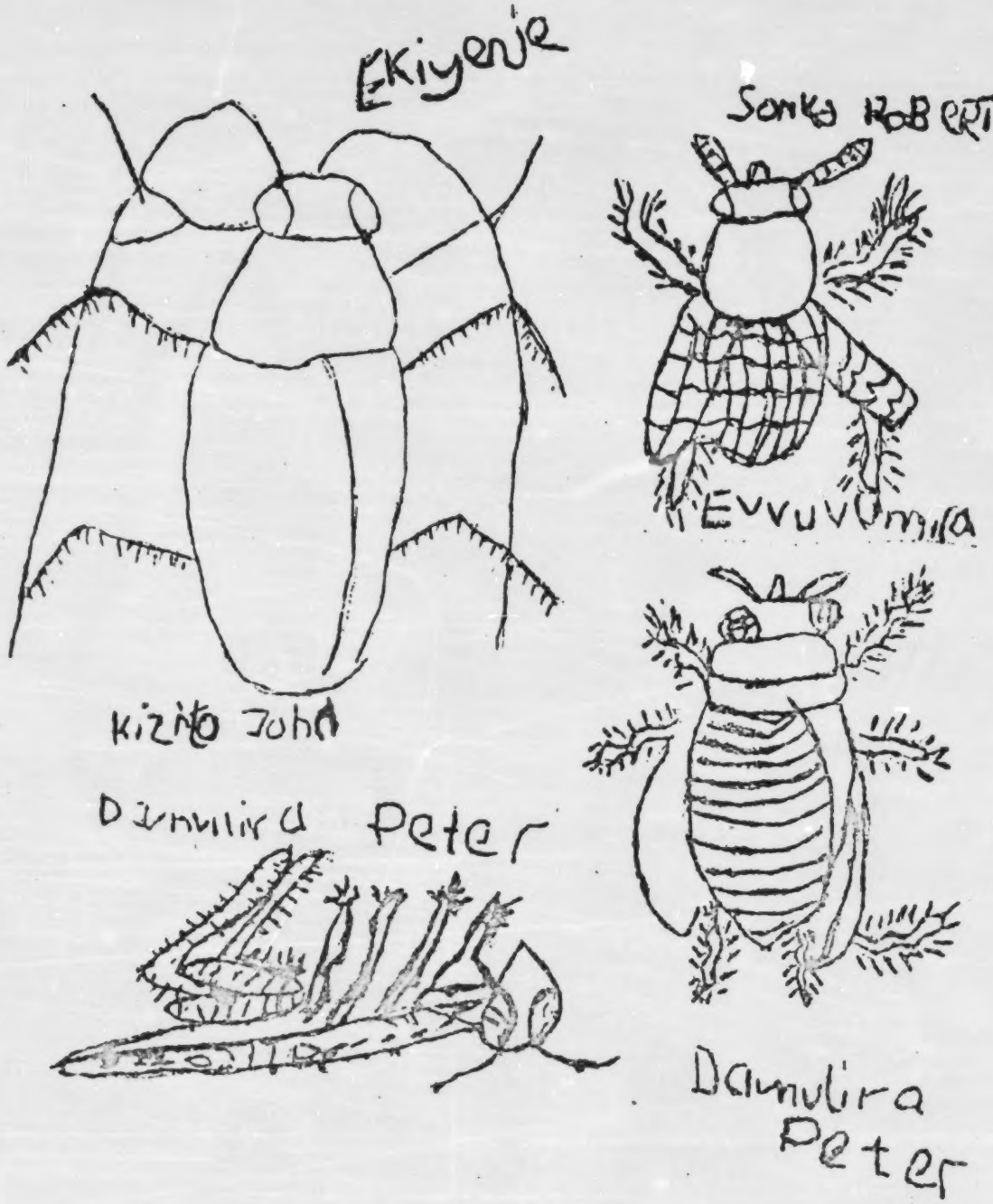
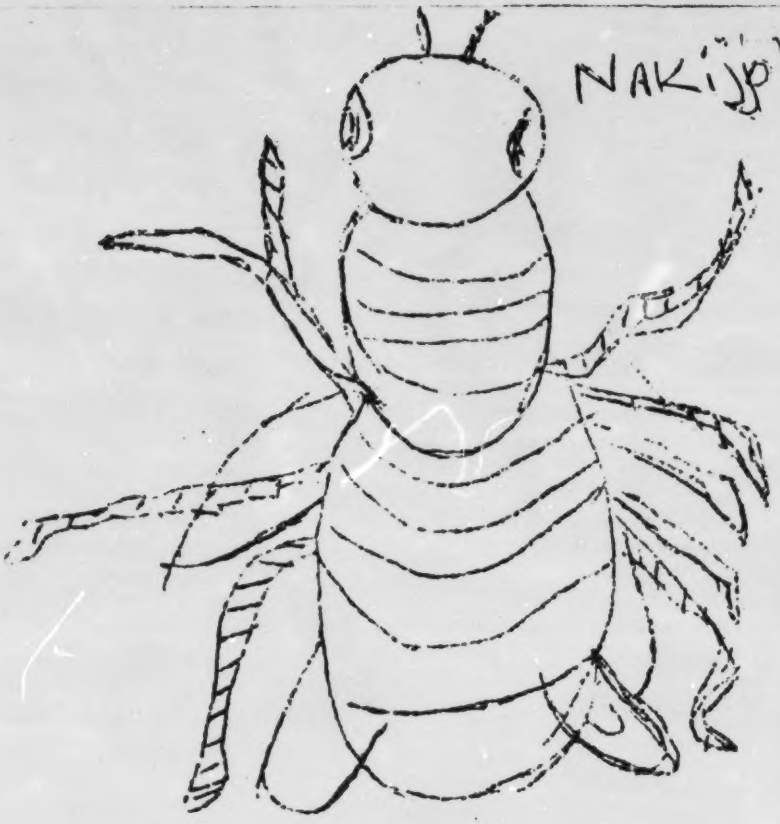

Ekiyenje
Sonko ROBERT
Evvuvumira
Kizito John
Damulira Peter
Damulira
Peter

Fig. 18



Ngabire milliAM Namaala EKiYEaJE

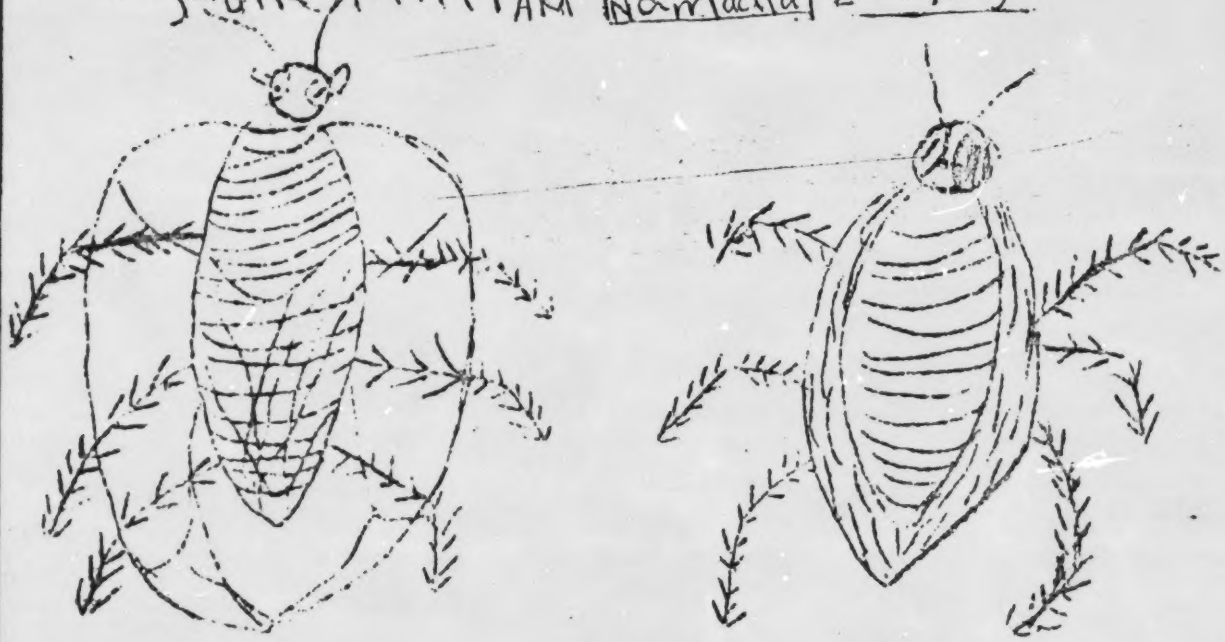


Fig. 19

WHERE DO CATERPILLARS COME FROM ?

Nakate : Teacher, today we are going to see our potato garden.

Teacher : Yes, but you will go in the afternoon. It is English time now.

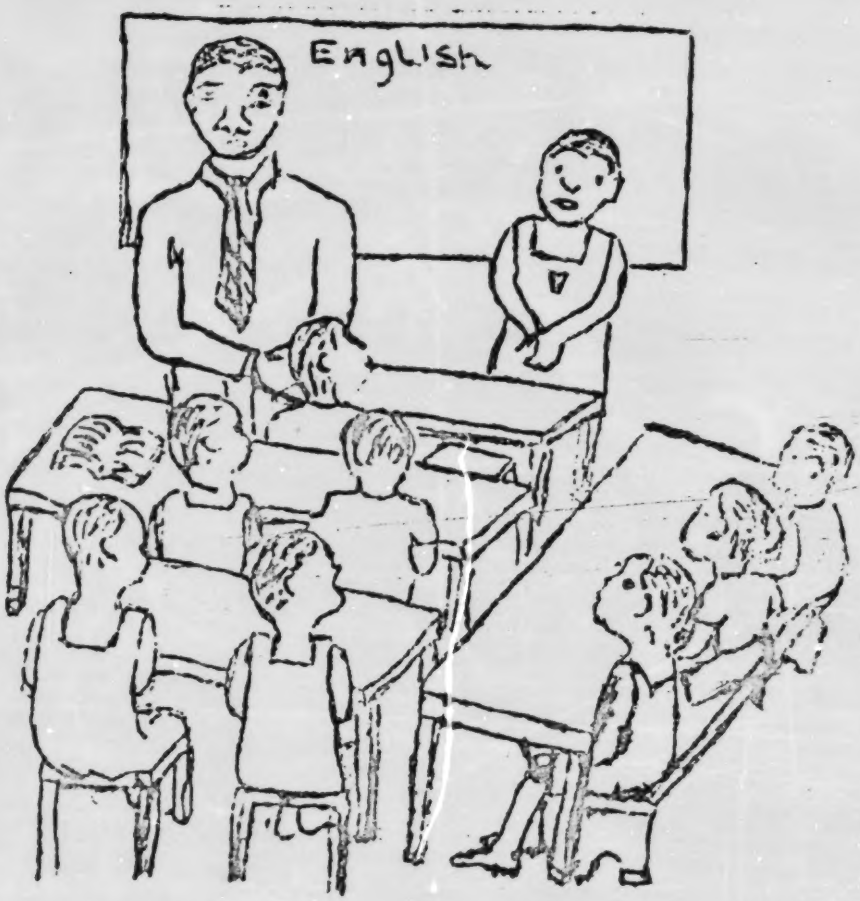


Fig. 20

In the afternoon the class went to see their garden.

Lucasi said : "Nakate, come and see."

Nakate : "See what ?"

Lucasi : Caterpillars on the potato leaves.

Nakate : Don't tell me. I don't want to look at caterpillars. I fear them. But where do they come from ?

Lucasi : I don't know. Let's find out.

Fig. 21

Nakate : Look at those butterflies. They are flying up and down on the potato leaves. Look. Up - down - up - down. They open their wings up and down.

Lucasi : Are they dancing, eating or playing, what are they doing ?

Nakate : Let me see what one has done there. Lucasi, look, what are these ?

Fig. 22

Lucasi : I don't know. Let's take more leaves and ask the teacher.

Nakate : Teacher, caterpillars ate our potato leaves. We saw butterflies falling and flying. One butterfly left these things on the leaves. What are they ?

Teacher : I don't know. They are like eggs of a butterfly.

Nakate : Teacher, do you know where caterpillars come from ?

Teacher : I don't know let's keep these eggs and see. Let's keep them in a tin. Look at them every day and write what you see every day.

After five days there were young caterpillars walking. Caterpillars come from butterfly eggs. The class gave caterpillars potato leaves. They ate them. They stopped eating and walking. After 25 days caterpillars changed into butterflies.

Nakate and Lucasi said : Caterpillars come from butterfly eggs.
Caterpillars changed into butterflies.

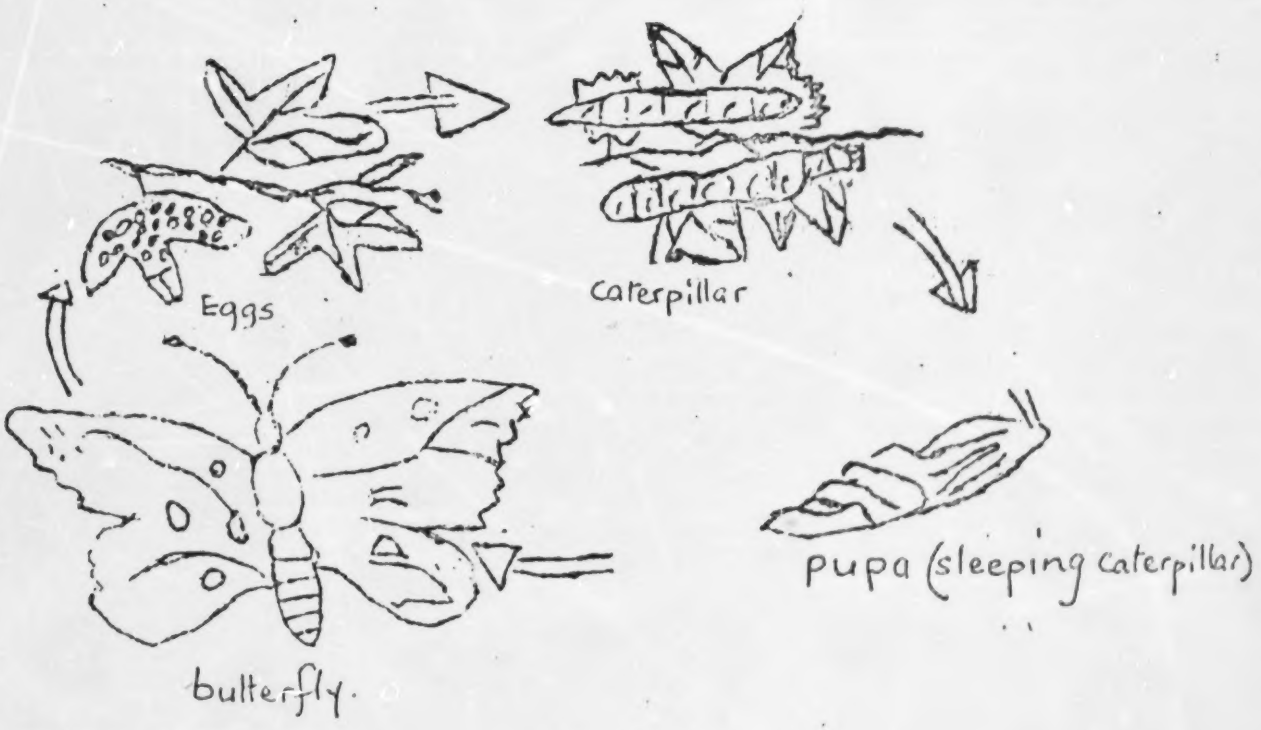


Fig. 23

ACTIVITIES

1. Collect butterfly eggs. Keep them. Tell what you see after two weeks.

2. Tell where caterpillars come from.

3. Suggest and carry out means of controlling caterpillars.

4. Why should we control caterpillars?

CHAPTER 4

EVALUATING THE READERS.

EVALUATION INSTRUMENTS

QUESTIONNARE TO BE COMPLETED BY THE TEACHER WHO TRIES THE READERS.

Please complete this questionnaire while trying these readers.

Name of teacher..... (Optional)

Class..... No. of pupils in class..... Date.....

1. How much time did you give the pupils to read each reader ?

10 minutes
20 minutes
30 minutes

2. How long did the first pupil take to finish reading each reader ?

Reader No.	Time taken
1	
2	
3	
4	
5	

3. How much time did the slowest pupil take to finish reading each Reader ?

Reader No.	Time Taken
1	
2	
3	
4	
5	

4. How many pupils called you to explain difficult words ?

5. What were the difficult words.....

.....

6. How many pupils called you to explain what they had read and in what reader ?

.....

7. What reader did they like best ? Tick one. Reader No. 1 2 3 4 5

8. Why do you say they liked that best ?.....

.....

9. What reader did they like least ? Tick one Reader No. 1 2 3 4 5

Why do you say so ?.....

.....

10. Did they talk to their friends during reading ? Yes No

11. What were they discussing ? .....

....

12. According to you, how much would you say pupils enjoyed the readers ?

Reader No.	Very Much	Much	Not much	Not at all
1				
2				
3				
4				
5				

13. Did they like to do the activities ?
    Tick one. Very much. Much. Not much. Not at all.

14. What activities did they like best ?

Reader No.	Activity No.
1	
2	
3	
4	
5	

15. Which of these activities did they like best ?

Setting experiments.

Observing experiments every day.

Drawing what they saw.

Explaining what they had read.

Explaining what they had done.

Collecting insects.

Answering questions.

16. Some activities were to fill in blanks. How many got the answers as follows?)

Reader No.	All right	More than ½ right	½ right	Less than ½ right	All wrong
1					
2					

17. Were they able to explain to class what they had read ?

Reader No.	Very clearly	Clearly	Not clearly	Not at all
1				
2				
3				
4				
5				

QUESTIONNAIRE FOR PRIMARY 3 PUPILS.

1. I have enjoyed

Reader No.	Very much	Much	Not much	Not at all
1				
2				
3				
4				
5				

2. Do you want to read more science readers ?
   Very much. Much. Not much. Not atall

3. What do you want to read about ?....56.....

ANALYSIS OF EVALUATION - RESULTS AND FINDINGS

Table 1. Showing time taken by pupils to read and complete each reader in minutes.

Reader No.	Fastest pupil	Slowest pupil	Average
Reader No. 1	15	30	23
Reader No. 2	15	25	20
Reader No. 3	20	30	25
Reader No. 4	15	25	20
Reader No. 5	20	30	25

Each reader was read and completed by the slowest and fastest pupils within 30 minutes. The average time required to read each reader lies between 20 and 25 minutes. Since the lessons for Primary 3 are usually 30 - 40 minutes, each reader can be read in one lesson giving the pupils about 10 minutes to carry out the activities at the end of each reader immediately after reading it. The readers are short and can maintain pupils' interest in reading them. Readers number 3 "Where do butterflies come from?" and Reader number 5 " Where do caterpillars come from ?" took longer time to read may be because they were a bit longer and also girls were not interested in caterpillars.

Table 2. Showing pupils interested in each reader.

Reader No.	Enjoyed very much	Much	Not much	Not atall
1	36	8	9	2
2	65	-	-	-
3	22	7	4	20
4	23	16	20	6
5	17	27	14	3

Readers No. 2 "Kamya finds out where round worms come from." was most interesting and enjoyed by the pupils because it was about Kamya who ate dirty mangoes and got stomach pain. This is a common practice in pupils' life at home and school. It also used familiar names of pupils in the school. Reader No. 1, "Where does rain come from?" was also very interesting because they enjoyed making rain and the experiment on water evaporation. Reader No. 3, " Where do butterflies come from ? " was least enjoyed because girls do not like caterpillars.

Table 3. Showing activities most liked in each reader.

Reader No.	Activity
1	Making experiments.
2	Filling in the gaps questions.
3	Observing experiments.
4	Collecting and drawing insects.
5	Looking for butterfly eggs.

Table 4. Showing number of pupils who got the fill in comprehension questions correct.

Reader No.	All Correct	More than ½ correct	½ correct	Less than ½ correct	All wron
1	43	13	6	3	0
2	45	9	6	5	0

The table shows that the readers were simple because pupils understood what they read. More than ⅔ of the class got the questions correct in reader No. 1 and 2 where comprehension was tested.

Table 5. Showing pupils being able to explain(communicate) what they had read.

Reader No.	Very clearly	Clearly	Not clearly	Not atall
1		✓		
2	✓			
3			✓	
4		✓		
5		✓		

It is clear that children were able to explain to the class very clearly reader No. 2 This is because the reader was about a very familiar topic in their environment.

Readers number 1,2 and 5 could be explained clearly. In reader No. 4, pupils found some difficulty in naming the insects they had collected. They explained it freely, when they had been told to describe them in venacular instead of English. Reader No.3 could not be explained maybe because the experiment needed a long

time of observation to reach a conclusion. Pupils might have forgotten what they had read and done.

Table 6. Showing the extent to which pupils liked the activities at the end of the readers.

Activity	Very much	Much	Not much	Not atall
Making experiments	✓			
Observing experiments		✓		
Drawing what they saw	✓			
Explaining what they had read.		✓		
Answering questions	✓			
Collecting insects	✓			
Interpreting what they had done or seen.			✓	

The table shows that pupils were very much interested in the following Scientific Skills: Experimentation, Drawing and Collecting. These were well developed. They were much involved in observation and communication (explanation). Observation was less liked because the observation needed a long time to be watched days instead of minutes or hours. Interpreting data was least liked because it is a skill more difficult to develop than others.

FROM PUPILS' QUESTIONNAIRE

Table 7. Showing how much pupils enjoyed each reader.

Reader No.	Very much	Much	Not much	Not atall
1	30	13	9	3
2	65	-	-	-
3	25	4	4	19
4	23	18	18	6
5	17	30	10	4

In general this table shows similar results as those in Table 2 of the teacher. Reader number 2 was most enjoyed by all pupils followed by Reader number one. The difference is in reader 3 and 4 where according to teacher 22 pupils very much enjoyed reader 3 but according to pupils table 25 pupils enjoyed reader No. 3 very much. However the two tables are more similar than different.

Table 8. Showing the number of pupils who would like to read more supplementary science readers.

Number of pupils in class	Very much	Much	Not much	Not atall
65	50	15	0	0

It is clear that the readers have very much generated interest in the pupils in reading science books.

TOPICS PUPILS WOULD LIKE TO READ ABOUT

Birds	Cats	Crocodile	Snakes
Chameleon	Gecko	Frogs	Dogs
Spiders	Rats	Bats	Maize
Moon	Animals	Tomatoes.	

From this list, it can be seen that pupils are more interested in animals and small animals in particular, than plants. This may have been influenced by the 5 readers which were on animal life or they are just interested in animals moving round their homes such as cats, dogs, frogs and spiders. Disease as a topic they want to read more about may have risen as a result of their great interest in reader number 2 "Kamya finds out where round worms come from."

CHAPTER 6

DISCUSSION AND CONCLUSION.

The major findings and conclusions of this study may be summarised as follows:

(a) The study through the five readers developed, can be said to have aroused and maintained pupils interest in reading science written materials. This is shown by the extent to which pupils enjoyed the readers as indicated in table 2 from the teacher's questionnaire and table 7 from the pupils' questionnaire. These tables show that a big majority of pupils very much enjoyed reading the supplementary science readers. Also table 8 shows that 50 out of 65 pupils are very much interested in reading more science readers. This is a clear indication of the interest this study has generated through the 5 readers.

(b) It has developed some scientific skills and attitudes through the 5 readers. These attitudes and skills include:
An inquiry mind, observation, experimentation, recording, reporting, communication, analysis and interpretation of data. This was done through the activities pupils did at the end of each reader and the interest they had in these scientific skills as indicated in table 6.

(c) It has enabled pupils gain science knowledge found in the readers through independent or group reading of these readers. Such knowledge include science facts and concepts and science phenomenon. The pupil's comprehension answers to questions at the end of the readers clearly indicate this because as shown in table 4 more than half of the class got all the answers correct.

Apart from achieving the above objectives, the study has proved that effective supplementary readers can be written cheaply but well enough to encourage an appreciation of written materials among pupils of low income parents especially in rural areas. Such cheaply and locally written readers by indigenous Ugandans can make books available in schools to be used by every child. This can save the much needed foreign currency of the country. This foreign currency can then be used to buy other inevitable essential commodities such as petroleum and science equipment instead of importing supplementary readers.

The study has also shown that the success of writing supplementary science readers depends on writing on relevant and familiar topics to pupils and using familiar vocabulary.

The study shows also that for the readers to be useful the teacher of a particular class for which the readers are written should be involved in choosing the topics, trying of the materials in the class and in evaluating the readers. The teacher who tried the readers felt that such supplementary readers were very much needed in schools because they provided pupils with literature of another subject other than English subject. Teachers said that there was a tendancy for schools to buy English Supplementary Readers only because there were no science readers available. The teachers too indicated a need for such readers for upper classes, Primary 4 to Primary 7 because they observed that some pupils from these classes also liked the five readers.

Since one of the most important learning experience required to implement Curriculum are text books, these supplementary readers will go a long way in facilitating the effective implementation of the Primary Science Curriculum in Uganda.

From the study, it can be assumed that according to the interest shown by the pupils in these supplementary readers many pupils will be able to have the desire to read more science books when they drop out of school, or continue with Secondary education. They may continue to read science books because of the independent reading skills and interest generated in science topics. This will give them chance to learn more science because learning is a life long process. Such interest in reading science readers will integrate the pupils in the scientific age and the book world in which they live.

Lastly, one must say that this study is but a humble effort to produce Original Supplementary Science Readers for Primary 3 pupils in Uganda schools. There is great need to produce more of such reading materials for lower and upper Primary classes to ensure continuity of the interest and enthusiasim generated by this study. The evaluation instruments used in this study are simple but very effective in getting quick evaluative information. It is the intention of the author to follow up this study for upper Primary classes.

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